

THE MITRE CORPORATION

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31 December 1972

D20-667

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Mr. Arthur Fihelly, Code 430
ERTS Technical Officer
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Re: BI-MONTHLY PROGRESS REPORT, PR-568/MMC# 200, Environmental
Indices from ERTS-1, NAS 5-21482

Gentlemen:

The MITRE Corporation is pleased to submit a progress report
for the period of October 22, 1972 through December 21, 1972. To
promote consistency and facilitate NASA review, MITRE has adopted
this format for all future Type I Progress Reports.

A. TITLE:

Investigation of Environmental Indices from the Earth
Resources Technology Satellites, PR-568/MMC# 200.

B. PRINCIPAL INVESTIGATOR:

Dr. Richard S. Greeley. Request for change in Principal
Investigator has been filed (October 2, 1972) with ERTS
Program Scientist, Dr. Arch B. Park. No reply has been
received as of this date.

C. PROJECT OBJECTIVES:

MITRE will develop environmental indices covering land,
water and air quality compatible with ERTS-1 imagery. Two
sites in Pennsylvania have been selected for examination.
Such indices will reveal the trends occurring in the
environment and will prove useful to Federal, state and
local governments in their management of the environment in
other areas.

D. SUMMARY OF PROJECT STATUS:

Phase I activities have occurred in all four sub-phase
areas (Figure 1) during this two-month effort. A brief
statement of accomplishments in each are presented below.

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(E72-10330) INVESTIGATION OF
ENVIRONMENTAL INDICES FROM THE EARTH
RESOURCES TECHNOLOGY SATELLITES Bimonthly
Progress Report R.S. Greeley (Mitre
Corp.) 31 Dec. 1972 7 p CSCI 08E
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CR-129644

- o The Experiment Parameter Analysis (Task I.1.1) is being drafted and will be included in the Type II Report due February 21, 1973.
- o The Experiment Site Selection (Task I.1.2) completed in the last reporting period is shown in Figure 2. No additions or deletions have occurred and are not to be expected until the end of Phase II.
- o The Software Procurement (I.1.3) was completed during the previous reporting period. Procurement of the terminal and modem for remote job entry to the Pennsylvania State University (PSU) computer from MITRE's McLean facility has taken place. Installation and check-out will occur in the next reporting period. Present computer efforts are being conducted from terminals physically on the PSU campus.
- o The DCP Experiment Planning, Sub-Phase I.2, has been completed. After several iterations, it has decided to place one DCP on the Renovo water quality station and the other DCP on a water quantity station in Harrisburg. Arrangements have been made with USGS/Harrisburg to install and service these two DCP's. Such installations will support the Susquehanna River Basin Commission in its assessment of the river and the value of DCP's as a method of data handling. The DCP's were shipped to USGS/Harrisburg on November 20, 1972 and are expected to be in operation in the next reporting period.
- o The MSS Implementation, Sub-Phase I.3, was completed during this reporting period. Test runs using MSS imagery and tapes were performed using the August 1, 1972 (1009-15241) scene of the greater Harrisburg area as a sub-test site. Some minor tape errors were uncovered and corrected. This scene was the first data received. (Tapes were received November 6, 1972--imagery did not arrive until November 25, 1972). A comparison of the PSU digital data reduction techniques with the abilities of trained photo-interpreters was performed, with each instructed to perform his analysis without discussions with the other group. Our findings show that both analysis approaches are required at this juncture if we are to classify land use into the categories suggested in our proposal. Further experimentation is now underway with the cross-fertilization of results being allowed on the same sub-test site.

- o Phase II, Preliminary Data Analysis, is underway. Only one scene, out of the nine acceptable scenes (less than 25% cloud cover) received to date has been examined. See Figure 3 for dates of other acceptable scenes. Nine distinct land use categories have been determined for the Harrisburg sub-test site. Our next efforts are to examine the same sub-test site for another date, October 11, 1972 (1080-15185), in order to crystallize our Data Analysis Plan due January 31, 1973.

E. SIGNIFICANT RESULTS:

None.

F. PROBLEMS:

None. The delay in schedule felt to be necessary in the last progress report (October 31, 1972) is not expected to occur.

G. RECOMMENDATION FOR TECHNICAL CHANGES:

None.

H. ADEQUACY OF FUNDING:

No problems seen at this time.

I. CHANGES TO STANDING ORDER FOR DATA:

None.

J. PUBLICATIONS IN THE REPORTING PERIOD:

None.

K. WORK PLANNED FOR NEXT REPORTING PERIOD:

- o DCP will be installed and put into operation at Renovo and Harrisburg.
- o Repeat of the signature analysis for the sub-test site area of Site 1 will be performed for at least two other scenes (dates) using both digital and photo-interpretation techniques.
- o Data Analysis Plan will be completed and forwarded to NASA for approval.


Mr. Arthur Fihelly

-4-

31 December 1972
D20-667

Questions concerning this report should be directed to the undersigned at (703) 893-3500, extension 2771, or to Mr. Edward A. Ward at (703) 893-3500, extension 2237.

Sincerely,



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ERTS ENVIRONMENTAL INDICES PROGRAM SCHEDULE

CY 1973

Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
PHASE I - DATA ANALYSIS PREPARATION																
I.1 MSS EXPERIMENT PLANNING																
I.1.1 Environmental Parameter Analysis																
I.1.2 Experiment Site Selection																
I.1.3 Software Procurement																
I.2 DCP EXPERIMENT PLANNING																
I.2.1 DCP Site Selection																
I.2.2 DCP Station Design																
I.2.3 DCP Hardware Procurement																
I.3 MSS IMPLEMENTATION																
I.3.1 MSS Imagery Test Run																
I.3.2 MSS Non-Imagery Test Run																
I.3.3 Environmental Index Test Run																
I.4 DCP STATION IMPLEMENTATION (Optional 90 days after Receipt of DCP)																
I.4.1 Installation of Air Quality Station																
I.4.2 Installation of Water Quality Station																
PHASE II - PRELIMINARY DATA ANALYSIS																
II.1 FIRST TWO MONTHS DATA PROCESSED																
II.2 DATA REQUIREMENTS REVISION																
II.3 DATA ANALYSIS PLAN DEVELOPMENT																
PHASE III - CONTINUING DATA ANALYSIS																
III.1 PROCESS MSS DATA																
III.2 COMPARISON OF REMOTE & IN-SITU DATA																
III.3 FINAL REPORT DEVELOPMENT & REVIEW																
III.4 COMPUTER PRODUCT RETURNED																
III.5 DCP BREAKDOWN & RETURN																
III.6 ARCHIVING OF EXPERIMENT RESULTS																
REPORT DUE DATES																
DATA ANALYSIS PLAN - (3 MONTHS AFTER RECEIPT OF FIRST ERTS-I DATA)																
DATA REPORTS TO PENN., EPA, CEQ, ETC. (AS AVAILABLE)																
TYPE I PROGRESS REPORTS																
TYPE II PROGRESS REPORTS																
TYPE III FINAL REPORT (DRAFT DUE 30 DAYS AFTER COMPLETION OF PHASE III, NASA REVIEW - 30 DAYS LATER, FINAL REPORT 30 DAYS LATER)																
FINANCIAL MANAGEMENT REPORTS																

FIGURE 2

ERTS PRELIMINARY TARGETS

SITE	TARGET AREA	TARGET QUANTITIES	LAND AIR, OR WATER	SUGGESTED BY
1	HOLTWOOD DAM LAKE	ALGAE, THERMAL, SILT	W	EPA REGION III; PA. W.Q.
1	CONOWINGO DAM LAKE	" " "	W	" " " "
1	SAFE HARBOR LAKE	" " "	W	" " " "
1	CODORUS CREEK LAKE (INDIAN ROCK)	" " "	W	" " " "
1	BRUNNER ISLAND EFFLUENT	" " "	W	" " " "
1	CONEWAGO CREEK MOUTH	THERMAL, CHEMICALS, SILT	W	" " " "
1	LIME KILN AT ANNVILLE	THERMAL, SILT	W	" " " "
1	HARRISBURG	PLUME DYNAMICS & LONG TERM EFFECT ON VEG.	A	" " " "
1	SUSQUEHANNA RIVER-SUNBURY TO MD.	HAZE, ALL AIR & WATER QUALITY PARAMETERS	A, W	" " " "
1	LANCASTER	WATER QUALITY	W	STATE OF PA.
1	YORK	HAZE, ALL AIR QUALITY PARAMETERS	A	" " " "
1	SWATARA CREEK MOUTH	" " "	A	USGS/HARRISBURG
1	CONESTOGA CREEK MOUTH	SILT	W	" /
1	JUNIATA RIVER MOUTH	SILT, OIL	W	" /
1	THREE MILE ISLAND	SILT	W	PSU
1	ALL OF SITE 1	ALL AIR & WATER QUALITY PARAMETERS	A, W	STATE OF PA.
1	ALL OF SITE 1	LAND USE	W, L	"
1	ALL OF SITE 1	ANY DENUDE AREAS	L	"
2	ALL OPEN PIT MINES	LINEAR DIM., AREA, & VOLUME; PH, THERMAL	L, W	EPA REG. III; PA. W.Q.O.
2	" REFUSE BANKS	" " " " & " " "	L, W	" " " "
2	SUSQUEHANNA RIVER	ALL WATER QUALITY PARAMETERS	W	" " " "
2	" " AT DANVILLE	" " " " "	W	" " " "
2	" " AT HUNLOCK CREEK	" " " " "	W	" " " "
2	SCRANTON	HAZE, ALL AIR QUALITY PARAMETERS	W	" " " "
2	WILKES-BARRE	" " " " "	A	STATE OF PA.
2	ALL OF SITE 2	" " " " "	A	" " " "
2	" " " 2	LAND USE	W, L	" " " "
2	" " " 2	ANY DENUDE AREAS	L	STATE OF PA.

FIGURE 3

ERTS-1 IMAGERY LOG FOR SITES I (HARRISBURG) & 2 (SCRANTON)

SATEL- LITE NO.	I. D. NUMBER			ORBIT NO.	RBV							MSS	DATE	SITE NO.		REMARKS	DATE RECEIVED	
	DAYS SINCE LAUNCH	HR.	MIN.		1	2	3	4	5	6	7			1	2		TAPE	IMAGES
1	007	15	12	96	G	F	G	G	G	G	G	G	Jul 30	X	X	-	-	-
1	007	15	13	96	F	G	G	G	G	G	G	G	Jul 30	X	X	-	-	-
1	008	15	18	111	G	P	G	G	F	G	G	G	Jul 31	X	X	-	-	-
1	008	15	18	111	G	P	G	G	F	G	G	G	Jul 31	X	X	-	-	-
1	009	15	24	124	G	G	G	G	G	G	G	G	Aug 01	X	X	Special Ordered 9/28/72	11/6/72	11/25/72
1	009	15	24	124	G	G	G	G	G	G	P	P	Aug 01	X	X	Special Ordered 9/28/72	11/6/72	11/25/72 (-4)
1	025	15	12	347	-	-	-	F	G	G	G	G	Aug 17	X	X	-	-	-
1	025	15	13	347	-	-	-	G	G	G	G	G	Aug 17	X	X	-	-	-
1	025	15	18	361	-	-	-	G	G	G	G	G	Aug 18	X	X	-	-	-
1	026	15	18	361	-	-	-	G	G	G	G	G	Aug 18	X	X	-	-	-
1	026	15	18	361	-	-	-	G	G	G	G	G	Aug 18	X	X	-	-	-
1	027	15	24	375	-	-	-	G	G	G	G	G	Aug 19	X	X	Reviewed at GSFC (No Good)	-	-
1	027	15	24	375	-	-	-	G	G	G	G	G	Aug 19	X	X	Reviewed at GSFC (No Good)	-	-
1	043	15	13	598	-	-	-	G	G	G	P	P	Sep 04	X	X	Reviewed at GSFC (No Good)	-	-
1	044	15	18	612	-	-	-	G	G	G	P	P	Sep 05	X	X	Tape Ordered 10/27/72	10/26/72	7
1	044	15	18	612	-	-	-	G	G	G	P	P	Sep 05	X	X	Tape Ordered 10/27/72	10/30/72	
1	045	15	24	626	-	-	-	G	G	G	P	P	Sep 06	X	X	Cloud cover 100% over Site 2	-	-
1	061	15	12	849	-	-	-	G	G	G	P	P	Sep 22	X	X	Cloud cover 100% in ctr Site 1	-	-
1	062	15	18	863	-	-	-	G	G	G	P	P	Sep 23	X	X	Cloud cover 100% in ctr Site 1	-	-
1	063	15	24	863	-	-	-	G	G	G	P	P	Sep 24	X	X	Cloud cover 100% in ctr Site 1	-	-
1	079	15	13	877	-	-	-	G	G	G	P	P	Sep 24	X	X	Cloud cover 100% in ctr Site 1	-	-
1	079	15	13	1100	-	-	-	G	G	G	G	G	Oct 10	X	X	-	12/6/72	11/14/72
1	079	15	13	1100	-	-	-	G	G	G	G	G	Oct 10	X	X	-	12/6/72	11/14/72
1	080	15	18	1114	-	-	-	G	G	G	G	G	Oct 11	X	X	-	12/6/72	11/14/72
1	080	15	18	1114	-	-	-	G	G	G	G	G	Oct 11	X	X	-	12/6/72	11/14/72
1	080	15	19	1114	-	-	-	G	G	G	G	G	Oct 11	X	X	-	12/6/72	11/14/72
1	081	15	24	1128	-	-	-	G	G	G	G	G	Oct 12	X	X	-	12/5/72	11/17/72
1	081	15	25	1128	-	-	-	G	G	G	G	G	Oct 12	X	X	-	12/5/72	11/17/72
1	097	15	13	1351	-	-	-	G	G	G	G	G	Oct 28	X	X	-	12/5/72	11/17/72
1	098	15	18	1365	-	-	-	G	G	G	G	G	Oct 29	X	X	-	12/5/72	11/17/72
1	098	15	19	1365	-	-	-	G	G	G	G	G	Oct 29	X	X	-	12/5/72	11/17/72
1	099	15	24	1379	-	-	-	P	G	G	G	G	Oct 30	X	X	-	12/5/72	11/17/72
1	099	15	25	1379	-	-	-	P	G	G	G	G	Oct 30	X	X	-	12/5/72	11/17/72
1	115	15	13	1602	-	-	-	P	G	G	G	G	Nov 15	X	X	Prods. not rec'd as of 12/31/72	-	-
1	116	15	19	1616	-	-	-	P	G	G	G	G	Nov 16	X	X	Prods. not rec'd as of 12/31/72	-	-
1	116	15	19	1616	-	-	-	P	G	G	G	G	Nov 16	X	X	Prods. not rec'd as of 12/31/72	-	-
1	117	15	25	1630	-	-	-	G	G	G	G	G	Nov 17	X	X	Prods. not rec'd as of 12/31/72	-	-